

1.0 TECHNOLOGY NAME:

Wide Field of View Optics

2.0 SPONSORSHIP:

2.1 IPDT Sponsor:

Dexter Wang, SSG, 978-694-9991

2.2 Team Members:

Donald Lencioni, MIT Lincoln Laboratory, 781-981-7996; David Hearn, MIT Lincoln Laboratory, 781-981-0918; Karl Blasius, Raytheon SBRS, 805-562-7592

3.0 OVERVIEW (SUMMARY OF VALIDATION PLAN)

Validation plans consist of design validation and simulation in software covering optical thermal and mechanical simulations. Components will be fabricated and tested as components and as an assembled flight system.

4.0 INTRODUCTION (CONTRIBUTION TO 21ST CENTURY SCIENCE)

The contribution of this technology will be reduced number of sensors required for a given Earth coverage rate, significantly reducing mission costs.

5.0 TECHNOLOGY DESCRIPTION

6.0 TECHNICAL VALIDATION OBJECTIVES

6.1 Technical Validation Objective #1

The technical objective is demonstrate that the EO-1 WFOV optical design can be successfully developed into a flight worthy telescope subassembly. The detail design and manufacturing of these mirrors and the interaction with the optical metering structure can be use to validate the range of temperature under which the optical performance are held. The use of silicon carbide mirrors in the telescope will validate its flight worthiness for similar satellite applications.

6.1.1 Required data and necessary measurements

Validation of the WFOV usefulness will include component level surface figure data, system wavefront stability data taken over temperature and after mechanical environmental exposure. In addition, performance demonstration with active focal planes during ground I&T. The final validation will be successful imagery taken from Earth orbit over the operational field of view.

6.1.2 Approach

A series of testing will commence at the component level. SSG will perform optical bench level testing prior to delivery to MIT/LL for integration. Calibration and characterization will take place at MIT/LL at the sensor level.

6.1.3 Anticipated results

Successful results will be represented by wavefront data on mirrors surfaces and through the entire optical train. Imagery and the resultant MTF will validate the performance at both ground level testing and from in flight data.

6.1.4 Supporting I&T data

Fully documented results from I&T will support the validation of the WFOV concept.

6.1.5 Rationale (How the results prove the objective)

Valid wavefront and imagery data taken during the development of the system fully simulate the on orbit data anticipated. After ground results are validated by on orbit imagery, flight images of meeting the predicted resolution will fully validate and demonstrate the WFOV optical concept.

6.2 Technical Validation Objective #2

7.0 SCIENTIFIC VALIDATION OBJECTIVES

7.1 Scientific Validation Objective #1

There are no specific scientific objectives.

7.1.1 Required data and necessary measurements

7.1.2 Approach

7.1.3 Anticipated results

7.1.4 Supporting I&T data

7.1.5 Rationale

7.2 Scientific Validation Objective #2

8.0 SCHEDULE

9.0 REQUIRED MANPOWER

10.0 REQUIRED FACILITIES

11.0 SIGNATURES

IPDT Provider

Project Scientist

Project Manager

GSFC Program Manager

NMP Program Manager